SMART SPP

innovation through sustainable procurement

LCC-CO_2 tool user guide

Visual guide to using the life-cycle costing and CO_2 assessment tool (LCC-CO_2 tool)

www.smart-spp.eu

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Authors: Aure Adell and Alecs Gauder (Ecoinstitut Barcelona) & Dominik Seebach (Öko-Institut)

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Kolding Kommune
Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology
INETI
INSTITUTO NACIONAL DE ENGENHARIA, TECNOLOGIA E INOVAÇÃO, I.P.
ecoinstitut
BARCELONA
ICLEI
Local Governments for Sustainability
bfub
Bundesverband für Umweltberatung e.V.
ESPO
EASTERN SHIRES PURCHASING ORGANISATION
energia
Agência Cascais Energia
Bromley
THE LONDON BOROUGH
www.bromley.gov.uk
Ajuntament de Barcelona

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Part I – Introduction

I.1 Objective of the guidance

This User Guide accompanies the SMART SPP LCC-CO_2 Tool. The tool has been developed to help you calculate the life cycle costs (LCC) and CO_2 emissions of different products and services (referred to only as "products" from now on) to assist in procurement decision-making. It is specifically targeted at evaluating innovative products, which are still in the phase of development and market introduction.

The User Guide has been produced to help you understand:

- What information the tool can provide
- How to use the tool in a tendering process
- How the tool should be completed, and by whom

The LCC-CO_2 Tool itself has been designed to accompany a Procurement Guide to driving energy efficient innovation through sustainable procurement, which particularly focuses on engagement with the market prior to tendering. The Procurement Guide and Tool can be downloaded from: **www.smart-spp.eu**.

I.2 What information does the tool provide?

The tool can be used to assess two different things that are, in the case of innovative energy-efficient technologies, very closely related: the life cycle costs and the CO_2 emissions of different product options. Up to 15 different products can be compared by the tool. The tool can also be used to assess your current situation and thus determine potential financial and CO_2 emissions impacts of innovative alternative solutions.

Life-cycle costs (LCC)

Life-cycle costs (LCC) (also called "whole life costs" (WLC)) are the costs that a product will cause to the contracting authority during its useful life[1] . Beyond the acquisition costs LCC also takes into account operational costs (particularly energy and water consumption), maintenance costs, taxes, and disposal costs/resale value.

CO_2 emissions

The tool can also be used to calculate the CO_2 emissions of products, considering both emissions deriving from operation of the product (operation emissions – mainly caused by energy consumption) as well as embedded emissions (i.e. emissions caused during production (including raw material extraction), transportation, installation and disposal). The tool also provides a differentiation between emissions deriving from direct combustion of fuels, and emissions due to electricity production (used for operating the product).

Tender evaluation

The tool also contains a function to allow it to be used for the direct evaluation of different offers during the tender evaluation stage.

[1] For further information read the SMART SPP report on Existing approaches to encourage innovation through procurement *http://www.iclei-europe.org/fileadmin/template/projects/smart_spp/files/SMART_SPP_D2.2_ExistingProcurementApproaches.pdf*, pp. 36.

I.3 When should the tool be used?

You can use the tool at different stages in the procurement process:

At a preparatory stage:

To assess the LCC and/or CO_2 emissions of your current solution. This can:

- give you a baseline to work from,
- identify the different cost elements relating to the product,
- allow better communication of the benefits of new technologies, and
- help define some general performance requirements for the new solutions.

Before tendering:

To roughly assess different proposals to help guide market engagement activities before tendering, or to narrow down the different technological solutions to be considered.

During tendering:

To compare the LCC and the anticipated CO_2 emissions of different offers, during the evaluation phase. If the tool is used during this phase, the authority must ensure that the information provided by companies is accurate and comparable by:

- defining in the tender set standards and test norms with experts and/or during market engagement, and
- asking suppliers to provide evidence in support of the information provided, preferably third party verified.

After tendering (if not already used):

To evaluate and communicate the LCC and CO_2 emissions improvements of the purchased product in comparison to the current situation and/or other products and to communicate results.

I.4 Who should fill in the tool?

Who within the contracting authority should be involved?

- The tool requires someone with knowledge of LCC and or/energy consumption and CO_2 emissions to operate (e.g. procurer, energy officer).
- When assessing your current situation, involve all departments which have relevant budgetary responsibilities (e.g. including energy costs, waste disposal).

Which parts should be completed by the supplier and which by the contracting authority?

➔ *Different models are possible:*

- Certain basic data must be completed by the authority *(see Part III)*.
- The authority may wish to further define the relevant cost positions for which supplier should provide information, or suppliers may be allowed to use their own cost models.
- Suppliers must be asked to provide evidence to support the costing and the information on CO_2 emissions that they submit.

Two specific options are presented in the table below:

Option A: **Suppliers respond to set questions**	***Option B:*** **Suppliers complete the tool directly**
Suppliers are given a document stating the exact information they must provide ***(see Part III)****, including evidence in support of their data.* *The procurer should then complete the tool with the data from each supplier in a different column of the tool.*	*Suppliers are asked to provide data directly in the tool in Column A or in the firsts columns if there are several elements involved in the offer. Evidence in support of the data should be attached.* *The procurer must then copy the information from each supplier in a different column into a single master file*

Attention! If the offers consist of several elements, you will have to manually make the addition of the results for each element (rows 63 and 94 in the GENERAL sheet) and introduce them in the tool (in those same rows). This is to know the total LCC and CO_2 emissions of the different proposed solutions and to be able to compare them.

Part II – General features of the tool

The tool consists of several worksheets whose tabs have been colour coded:

All sheets tabs in **light green** are to be directly used by you in order to enter data or evaluate the results.

All sheet tabs in **dark green** contain text for your information.

All sheet tabs in **dark grey** are background sheets for calculations and provision of specific information. You should only access those sheets through the hyperlinks buttons in each sheet.

The tool contains the following worksheets:

Introduction	Provides some basic information on the tool.
General	This is **the main worksheet for entering data.** It is split into three sections: • General information • LCC data input & results • CO_2 data input & results For certain life-cycle phases you can either enter single aggregated cost/CO_2 figures in this sheet, or select the option to specify detailed information. Choosing the second option will take you directly to other worksheets where you can provide a more detailed breakdown of costs/energy consumption/CO_2 emissions. This is where the numerical results of LCC-CO_2 calculations will be displayed.
LCC diagrams	This sheet provides a graphical display of the LCC results for the different products/services for which you have provided data.
CO_2 diagrams	This sheet provides a graphical display of the CO_2 emissions results for the different products/services for which you have provided data.
Tender evaluation	This optional sheet can be used for evaluating the different offers to identify the economically most advantageous offer. You will need to input your award criteria and weighting scheme to use it.
Conversion factors	If you want to make calculations in order to compare different units (e.g. MJ and kWh) this sheet provides you with the respective conversion factors.
Glossary	A glossary of terms used in the tool.
Emission factors	This sheet provides emission factors for various fuel types. You can use either one of the provided lists of emission factors or create your own customised list.
Annual investments	This sheet can be filled in for lease agreements or when reinvestments are necessary during the usage period.

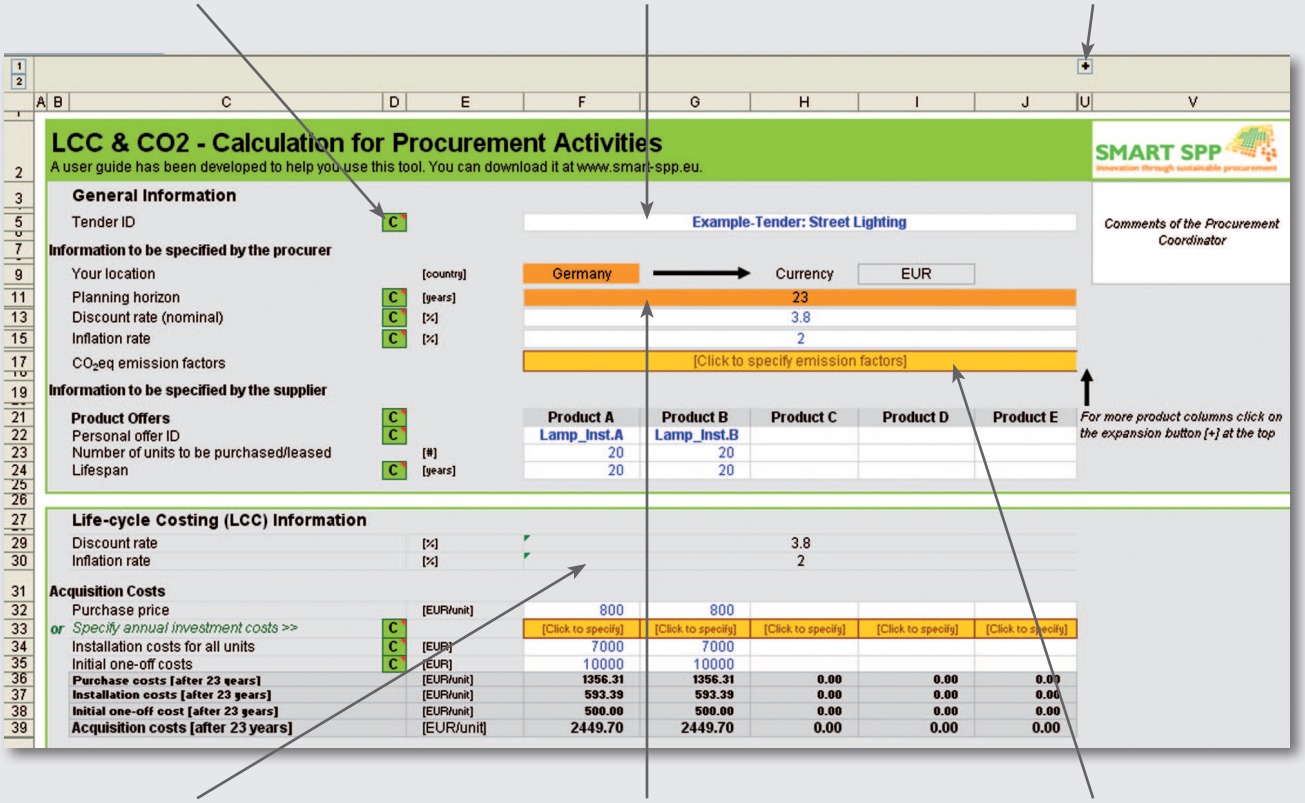
Operation	Here you can calculate the operational costs and emissions of the offers in detail. It can take into account fuel types used, different operational modes, and working time.
Maintenance	Here you can specifythe maintence costs of the offers in detail. It takes into account labour costs, spare parts, etc.
CO_2	Here you can specify the maintenance costs of the offers in detail. It takes into account labour costs, spare parts, etc.

Additionally, cells are colour-coded to help identify how to use them.

Red cells contain comments (draw your cursor over it to view them)

In **white cells** you have to input data

Click on **+/- button** to expand and reduce extra rows and columns.



Grey cells contain text or calculation results. These files are protected and **can not be altered!**

In **orange cells** you can select an option from the dropdown menu

Click on **light orange** – the links will bring you to other sheets where you can continue your input (and back again).

Finally, **Error alerts** are red text.

Part III – Step-by-step guide

III.1 How to fill in the tool

For reference:

CA. = **Data should be provided by the contracting authority**

S. = **Data should be provided by the supplier**

(LCC) = **Data only necessary for life-cycle cost calculations**

(CO_2) = **Data only necessary for CO_2 emission calculations**

Note: For most of the life-cycle phases, cost/CO_2 emission information can either be given as a single aggregated figure, or can be further detailed on separate worksheets within the tool. You will need to decide:

- Whether you accept single aggregated figures provided by suppliers (for example, if the tool is being used for rough calculations within the pre-procurement phase), or if it requires a more detailed breakdown of costs/emissions.
- Whether you wish to specify the exact types of cost/emissions to be included within each category. Within the tool, this can be left up to the supplier to define, or can be defined in advance by the authority with the suppliers simply requested for the figures and not given the tool itself to complete.

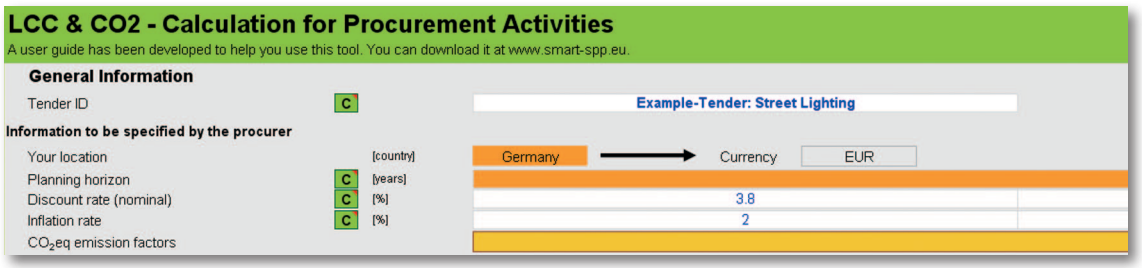
➔ *Let's get started!*

III.2 One example to guide you through

To help guide you through the tool, an example has been prepared with screenshots included below. The example is for a new streetlighting system. All information related to this and other examples are in dark green text.

STEP 1: INPUTTING GENERAL INFORMATION

Start with the input of data in the General Information section at the top of the GENERAL worksheet.



CA. **Tender ID:** Give the tender a short description or reference ID You can also add some further comments or explanation in the **area for further comments** on the top right corner.

CA. **Location LCC:** Choose the country where the activities will take place in order to automatically select the currency.

CA. **Planning horizon:** Choose a planning horizon (between 1 and 25 years) This term refers to the time period over which you wish to compare the different offers, that is to say the time period over which the LCC and CO_2 calculations will be made. As different products and solutions will have different replacement rates, considering which period you will assess is vital.

Example: *Product X needs to be replaced every 6 years and product Y every 15 years. If you consider the costs over a 5 year period (or planning horizon) purchase and installation costs will only occur once during the period (at the beginning). If instead you consider the costs over a 10 year period then the purchase and installation costs for Product X will occur twice, whilst still only once for product Y. In the included example a 23 year planning horizon has been chosen.*

The longer the planning horizon, the more important the life-span of the product appears. Therefore this needs to be carefully considered. You may consider using the contract period as the planning horizon, however this may still risk having a too short-term perspective to realise the potential benefits of durable products that naturally have a longer life exspectance. This is also important when finding the remanent value or end-of-life costs.

The tool will automatically also provide results with a planning horizon of 25 years.

CA. **Discount rate (nominal) LCC:** For simplicity you may use your country's interest rate (which includes inflation). For a definition, check the glossary sheet in the tool.

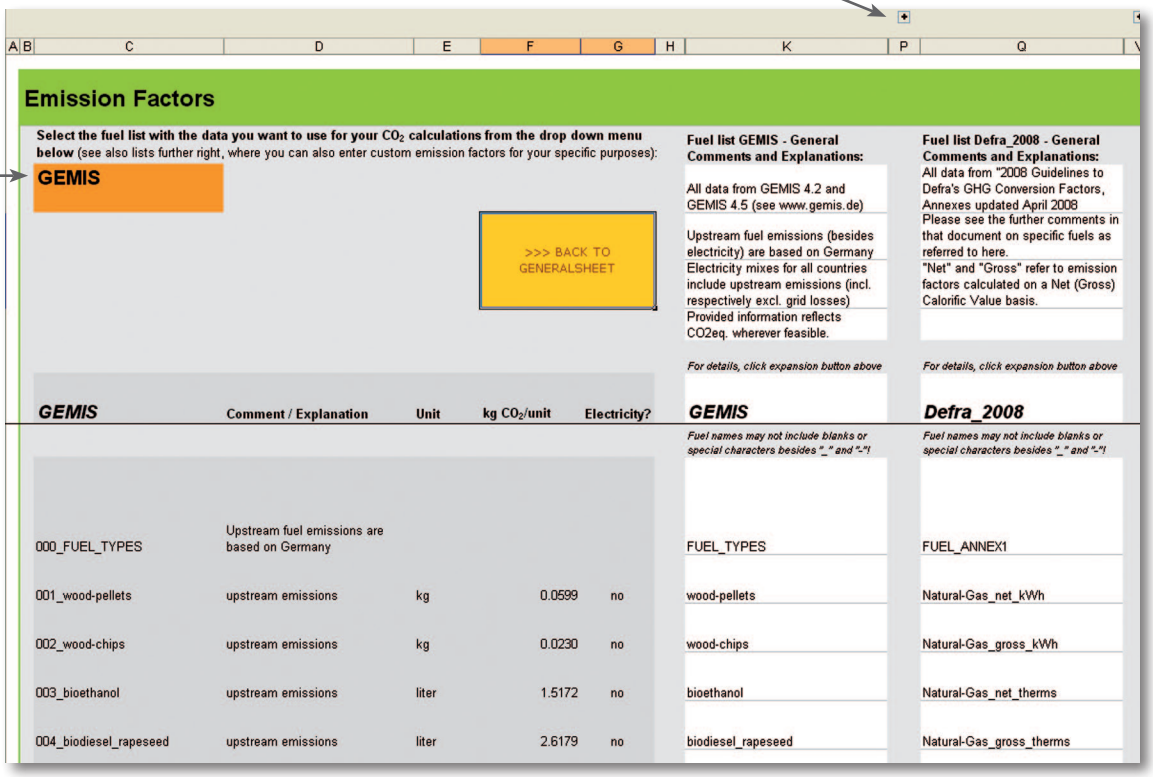
CA. **Inflation rate LCC:** You need to introduce this value in order for the calculation to obtain the real discount rate[2]. See tool glossary for a definition.

[2] For more information check the SMART SPP report on Exisiting approaches to encourage innovation throught procurement *http://www.iclei-europe.org/fileadmin/template/projects/smart_spp/files/SMART_SPP_D2.2_ExistingProcurementApproaches.pdf*, pp. 38.

CA. **Emission factors ^{CO_2}:** Click on the light orange botton. This will take you to the Emission Factors sheet where you will be able to specify the list of emission factors you want to use. This defines the amount of CO_2 emitted by the use of different fuel types (oil, gas, electricity etc.), which the tool uses to calculate the emissions caused during the use of the product.

In the Emission Factors sheet you can select one of the ready-prepared lists included with the tool **(GEMIS or Defra)** from the orange cell, or provide your own list.

For further information on the included fuels, click on the **+ button** on top of the sheet to expand more rows.

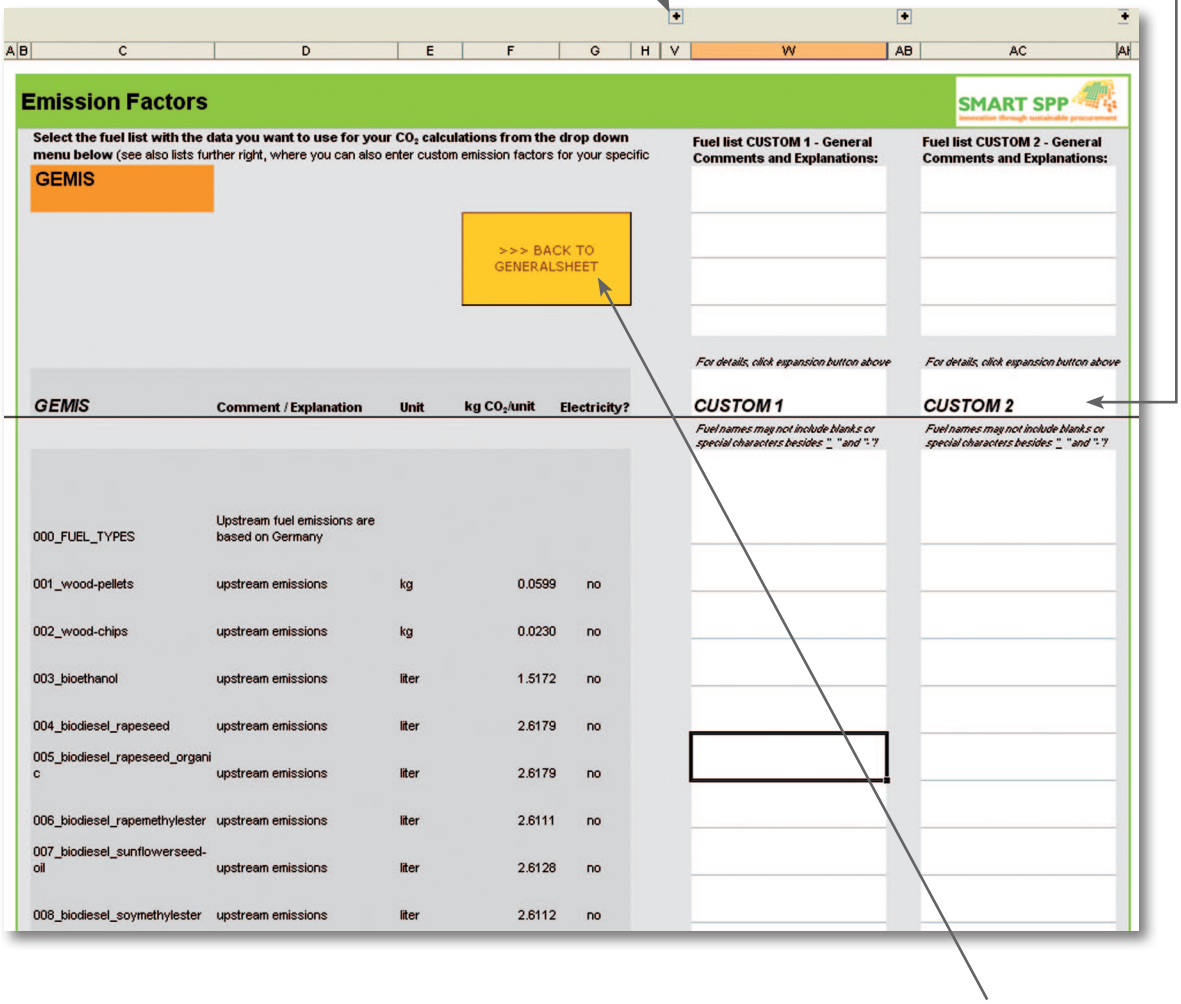

Emission Factors
Select the fuel list with the data you want to use for your CO2 calculations from the drop down menu below (see also lists further right, where you can also enter custom emission factors for your specific purposes):
GEMIS
>>> BACK TO GENERALSHEET
Fuel list GEMIS - General Comments and Explanations:
All data from GEMIS 4.2 and GEMIS 4.5 (see www.gemis.de)
Upstream fuel emissions (besides electricity) are based on Germany
Electricity mixes for all countries include upstream emissions (incl. respectively excl. grid losses)
Provided information reflects CO2eq. wherever feasible.
Fuel list Defra_2008 - General Comments and Explanations:
All data from "2008 Guidelines to Defra's GHG Conversion Factors, Annexes updated April 2008
Please see the further comments in that document on specific fuels as referred to here.
"Net" and "Gross" refer to emission factors calculated on a Net (Gross) Calorific Value basis.
For details, click expansion button above
For details, click expansion button above
GEMIS
Comment / Explanation
Unit
kg CO2/unit
Electricity?
GEMIS
Fuel names may not include blanks or special characters besides "_" and "-"!
Defra_2008
Fuel names may not include blanks or special characters besides "_" and "-"!
000_FUEL_TYPES
Upstream fuel emissions are based on Germany
FUEL_TYPES
FUEL_ANNEX1
001_wood-pellets
upstream emissions
kg
0.0599
no
wood-pellets
Natural-Gas_net_kWh
002_wood-chips
upstream emissions
kg
0.0230
no
wood-chips
Natural-Gas_gross_kWh
003_bioethanol
upstream emissions
liter
1.5172
no
bioethanol
Natural-Gas_net_therms
004_biodiesel_rapeseed
upstream emissions
liter
2.6179
no
biodiesel_rapeseed
Natural-Gas_gross_therms

Note: CO_2 emission factors for different fuels are only indicative and can vary considerably from country to country, and depending on usage.

The GEMIS and Defra lists provided reflect (respectively) German and UK conditions. You may find lists more suited to your country. GEMIS, however, also provides data for electricity for all EU countries, based on the national electricity mixes. For products only using electricity you might want to restrict the fuel list to one single option, which reflects your local electricity supply.

For this, just copy and paste the relevant option to one of the CUSTOM lists and choose the list in the orange cell.

To create your own fuel list, you can enter data in one of the **CUSTOM columns** (from column X onwards). To input data you must expand the columns with the **+ button** at the top of the sheet to view all input fields. For the fuel names do not use blank spaces or special characters except „_“ and „-“.


Emission Factors
SMART SPP
Select the fuel list with the data you want to use for your CO_2 calculations from the drop down menu below (see also lists further right, where you can also enter custom emission factors for your specific
GEMIS
>>> BACK TO GENERALSHEET
Fuel list CUSTOM 1 - General Comments and Explanations:
Fuel list CUSTOM 2 - General Comments and Explanations:
For details, click expansion button above
GEMIS
Comment / Explanation
Unit
kg CO_2/unit
Electricity?
CUSTOM 1
CUSTOM 2
Fuel names may not include blanks or special characters besides "_" and "-"!
000_FUEL_TYPES
Upstream fuel emissions are based on Germany
001_wood-pellets upstream emissions kg 0.0599 no
002_wood-chips upstream emissions kg 0.0230 no
003_bioethanol upstream emissions liter 1.5172 no
004_biodiesel_rapeseed upstream emissions liter 2.6179 no
005_biodiesel_rapeseed_organic upstream emissions liter 2.6179 no
006_biodiesel_rapemethylester upstream emissions liter 2.6111 no
007_biodiesel_sunflowerseed-oil upstream emissions liter 2.6128 no
008_biodiesel_soymethylester upstream emissions liter 2.6112 no

After choosing the Emission Factor list, go back to the **GENERAL sheet** by clicking on the button.

STEP 2: PRODUCT INFORMATION FROM THE COMPANIES

Step 2.1 General information

Once the previous information has been introduced, you will need mainly information from companies. You may either ask them to input the data directly into the tool, or send them a document outlining the information you require from them. The first part is the following general information to include in the GENERAL sheet:

Information to be specified by the supplier

			Product A	Product B	Product C	Product D	Product E
Product Offers	C						
Personal offer ID	C		Lamp_Inst.A	Lamp_Inst.B			
Number of units to be purchased/leased		[#]	20	20			
Lifespan	C	[years]	20	20			

In our lighting example in the first column (Product A) the data from the present situation has been introduced. The second column (Product B) represents one alternative to the present product.

S. **Personal offer ID:** Give a short (max. 12 letters) name for the offers of each company that will be shown in the diagrams sheet to better compare offers *(ie. Lamp_Inst.A and Lamp_Inst.B)*. If one offer consists of different products, companies should enter the information in neighbouring columns.

> ***Note:*** If one offer consists of different products you will need to combine the LCC and/or CO_2 results manually in order to give the totals – the tool cannot do this for you.

S. **Number of units to purchase:** Enter the number of product units which are needed in order to meet the total requirements of the tender. *For example 20 light posts and luminaires for the street lighting installation or 12 for the purchase of 12 hybrid buses.*

S. **Lifespan^{LCC}:** Enter the estimated time in years for which the product will be usable (note: 14 months is equivalent to 1.2 years). This may also depend on the amount which the product is used. In order to provide that information, the CA. should define in the tender how many hours the installation will be in operation. Based on this the S. will be able to calculate the lifespan of their product. *In our example, the lifespan of the lighting instalation refers to the posts and luminaires, estimated in 20 years for both products. Components that need frequent change, such as the lamps, are considered in the maintenance section.*

Step 2.2 Acquisition costs

Life-cycle Costing (LCC) Information						
Discount rate		[%]				
Inflation rate		[%]				
Acquisition Costs						
Purchase price		[EUR/unit]	800	800		
or Specify annual investment costs >>	C		[Click to specify]	[Click to specify]	[Click to specify]	[Click to specify]
Installation costs for all units	C	[EUR]	7000	7000		
Initial one-off costs	C	[EUR]	10000	10000		

Acquisition costs include the following:

S. **Purchase price^{LCC}:** By unit, including procurement taxes if applicable.
If our street lighting installation consists of 20 posts and luminaries, the total price for those elements will be divided by 20 to have the costs per unit.

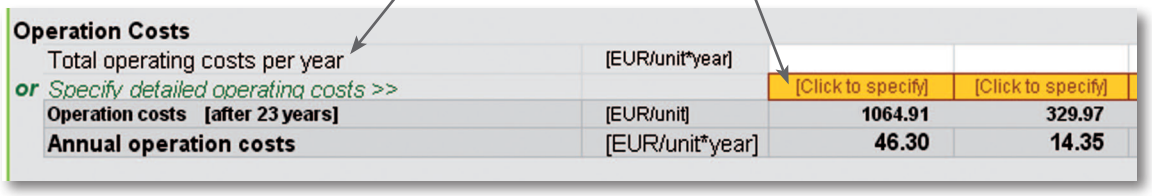
S. **Annual investments costs^{LCC}:** When you know that investments are necessary during the planing horizon and therefore no single purchasing price can be given, you will have to specify investment costs annually. Due to the formula in the tool, if you choose this option, remnant/end-of-life costs won't be calculated automatically. Therefore you will have to add them yourself in the annual investment costs (in negative or positive value respectively). We also recommend to include here the installation and other initial costs.

S. **Installation costs^{LCC}:** This is for the whole installation and does not depend on the number of units to be installed.

S. **Initial one-off costs^{LCC}:** This refers to one-off, non-repeating initial costs (for things such as training, communication, etc.). This excludes the purchase and installation costs These costs are normally independent from the number of units and from the lifespan of the product. The CA should specify in the tender whether this is necessary or not or leave it up to the bidders.

Step 2.3 Operation costs

Operation costs can be provided as an aggregated value in the GENERAL Worksheet or also be detailed in the specific (OPERATION) worksheet accessed though the light orange button.



Operation Costs			
Total operating costs per year	[EUR/unit*year]		
or Specify detailed operating costs >>		[Click to specify]	[Click to specify]
Operation costs [after 23 years]	[EUR/unit]	**1064.91**	**329.97**
Annual operation costs	[EUR/unit*year]	**46.30**	**14.35**

Note: If you also want to calculate CO_2 emissions, you will have to provide detailed information through the specific (OPERATION) worksheet.

If the product can be operated in different ways which affect energy consumption (i.e. different operation modes) these should be clearly defined in the tender/description provided by the CA so that bidders can adapt the information they provide accordingly.

If the S is given the tool to complete, then short names for the different operation modes can be included beforehand in the tool in ther (OPERATION) worksheet.

For example, for streetlights: full and reduced power with indication of annual hours for the respective operation modes. For vehicles: annual km within a city and on long-distance trips.

For each operation mode, the tool allows also for specifying different fuels, which might be relevant e.g. for multi-fuel vehicles or for heating and cooling. Alternatively suppliers may be left to define the different operating modes for their solution, together with the likely usage pattern. In this case they should be asked to provide a justification for their calculations with supporting evidence where possible.

In the specific (OPERATION) sheet a supplier (or the contracting authority if this is defined beforehand) can enter information for up to five different fuels or different operation modes for the product.

For "Energy source/op. mode 2 to 5", expand the respective rows by clicking on the **+ button** on the left side of the sheet.

Note: The wording of these elements is so abstract because each solution may function with different energy sources such as litres of fuel, kWh for electricity, etc. and with different reference units such as km, hours, etc.

For each energy source or operation mode you have to specify:

S. **Energy source/op mode 1:** choose the respective energy source for this operation mode from the drop down list of the orange cells.

S. **Specify operation mode:** Give an indicative name, *e.g. "full power", "reduced power"etc.*

CA. **Cost of the energy source LCC:** The cost by energy unit *(i.e. Euros/kWh)*. Check that this is consistent with the energy unit, which is automatically entered after choosing the energy source.

CA. **Energy type specific inflation rate LCC:** Considering the inflation rate is especially important for products with a high energy/water demand and/or in case of a long planning horizon; you should introduce the specific price increase for electricity and other fuels and water (provided by your national statistics). For all other operation materials the general inflation rate is applied. The energy type specific inflation rate should be the average data *(i.e. average for the last five or ten years)* in order to supress cyclical economic effects.

S. **Reference unit for consumption:** *i.e. per hour, km, etc.*

			Product A	Product B
Personal offer ID:			Lamp_Inst.A	Lamp_Inst.B
Energy source / op. mode 1			**037_DE_electricity-mix_incl-grid**	**037_DE_electricity-mix_incl-grid**
Energy unit (en. unit)			kWh	kWh
Emission factor		kg CO2 / en. unit	0.6754	0.6754
Specify operation mode	C		Full power	Full power
Costs 037_DE_electricity-mix_incl-grid per energy unit	C	[EUR]/en. unit	0.12	0.12
Price increase rate (energy type specific inflation rate)	C	[%]	3	3
Reference unit for consumption	C		h	h
Units of energy consumption per reference consumption unit			kWh / h	kWh / h
Nr. of units of energy consumption per reference consumption unit	C	en. unit / ref. cons. unit	0.142	0.044
Reference units per year			h / year	h / year
Average nr. of reference units per year		ref. units / year	2281.25	2281.25

S. **Nr. of units of energy consumption per reference consumption unit:** indicate how much energy the product consumes in terms of the reference unit you gave above *(i.e. energy consumption of 0.142 kWh/hour).*

Please note that the energy consumption must be measured in the energy unit which is automatically chosen for the energy source.

S. **Average nr. of reference units per year:** That is to say, how many *operation hours, km, etc.* or any other specified reference unit the product works in that operation mode and/or with the specified energy source within one year.

If the product consumes also water or requires other anual operation costs, the S. can also provide the information in this sheet. *In the example, also information has been provided for the energy mode „Reduced power".*

After entering all the information, click on the light orange button to go back to the GENERAL sheet.

Step 2.4 Maintenance costs

For this section data can also be given as a single global figure (in the GENERAL sheet), or can be further detailed through the link in the light orange button.

Maintenance Costs			
Total maintenance costs per year	[EUR/unit*year]		
or Specify detailed maintenance costs >>		[Click to specify]	[Click to specify]
Maintenance costs [after 23 years]	[EUR/unit]	**1938.39**	**1941.62**
Annual maintenance costs	[EUR/unit*year]	**84.28**	**84.42**

When maintenance costs are specificed in the (MAINTENANCE) sheet, bidders will have to provide the following data:

			Product A	Product B
Personal offer ID:			Lamp_Inst.A	Lamp_Inst.B
Annual fixed rate for maintenance for the specific product: put in here the **Price per year**		[EUR/unit*year]	100	100
Maintenance Flat Rate Prices			**100**	**100**
Spare Part 1 (SP1)	C			
Durability spare part		[Year]	2.3	3.2
Price for new spare part		[EUR]	5	7.5
Annual Average Replace. Costs SP1		**[EUR/unit*year]**	**2.17**	**2.34**
Spare Part 2 (press expansion button left)	C			
Spare Part 3 (press expansion button left)	C			
Spare Part 4 (press expansion button left)	C			
Spare Part 5 (press expansion button left)	C			
Other maintenance costs/unit regarding the whole product				
Annual Maintenance Costs / unit		**[EUR/unit*year]**	**102.17**	**102.34375**

S. **Annual fixed rate for maintenance:** *In our example, 100 EUR per lighting post and year.* This parameter may or may not include the cost of the spare parts, therefore the CA will have to specify that in the tender.

S. **Spare part 1** (up to 5)**:** If costs for spare parts are not included in the annual fixed rate, you need to specify the durability of the spare part and its price in order to calculate how many spare parts will be necessary during the planning horizon. *In our example, the lamps' lifespan depends, among other, on the time and intensity the installation is working. In order to provide that information, the CA should define how many hours in total the installation will be in operation (this is also necessary for the operation costs) and afterwards the S. will be able to calculate the lifespan in years of their products. If a lamp has a lifespan of 8.000 hours and the installation will be in operation 3.500 hours/year, the lifespan will be 2.3 years. If the luminaire cointains 3 identical lamps, you will have to multiply the "price for new spare" part by 3.*

S. **Other maintenance costs per unit regarding the whole product:** If there are other maintenance costs for the whole product (not spare parts) additional to the annual fixed rate by unit.

Step 2.5 Annual taxes/fees or other annual costs

Annual taxes / fees / subsidies or other costs	C	[EUR/unit*year]		
Other annual costs		[EUR/unit*year]	**0.00**	**0.00**

CA. Include the costs in annual taxes as well as other annual fees or subsidies of the product for the CA. Initial tax payments such as *matriculation taxes for vehicles* should instead be included in the purchasing price. All costs (taxes and fees) will be included in positive value. Subsidies, as they reduce the total costs of the product will need to be substracted from the total cost, therefore in negative value.

Step 2.6 Remnant value or end-of-life costs

At the end of the planning horizon the products may either be:

- out of service and require disposal in the correct manner, or
- still usable and have a value.

In the first case, the product may have an extra cost, which should be added in the LCC calculations.

In the second case you could decide to sell, in which case it will provide you with some money (the remnant value) which should be substracted to the LCC calculation.

Remnant value / End-of-life-costs	C	[EUR/unit]		
Remnant value / End-of-life costs [after 23 years]		[EUR/unit]	**0.00**	**0.00**
Annual remnant value / End-of-life costs		[EUR/unit]	**0.00**	**0.00**

CA. **Remnant value or end-of-life costs [LCC]:** Estimate the remnant value or disposal cost of the product and add it to the tool as a negative or positive value respectively. If the planning horizon is twice or more as long as the lifespan, the remnant/disposal costs will be included in the LCC calculation as many times as the product is renewed. If no costs or benefits are derived from the product, leave the cells blank.

Step 2.7 CO_2 specific information

S. **Emissions Use phase ^{CO_2}:** The tool allows you to directly enter CO_2 emissions from the use phase in the GENERAL sheet. This might be appropriate if you are in a very early planning stage and are only using "target values" for comparison or if you are comparing readily available pre-calculated values (this applies also for costs aspects).

CO_2-specific Information			
All figures you enter will be treated ***cumulatively***		**Product A**	**Product B**
Total embedded emissions	[kg CO_2/unit]		
or *Specify detailed embedded emissions >>*		[Click to specify]	[Click to specify]
Embedded emissions	[kg CO_2/unit]	**0**	**0**
Annual emissions: use phase	[kg CO_2/year/unit]		
Thereof emissions from electricity supply	[kg CO_2/year/unit]		
or *Specify detailed annual emissions >>*		[Click to specify]	[Click to specify]
Annual emissions: use phase	[kg CO_2/year/unit]	**286**	**89**
Thereof emissions from electricity supply	[kg CO_2/year/unit]	**67**	**21**

Mostly, a more differentiated specification should be made based on actual energy consumption information. For this, follow the link in the light orange cell that will take you to the (OPERATION) sheet.

S. **Embedded emissions ^{CO_2}:** In addition to the CO_2 emissions relating to energy consumption during use, products also contain embedded emissions. Most CO_2 monitoring schemes and targets of public authorities and other institutions only refer to emissions due to energy consumption in the use phase. For many products (particularly non-energy using products) such emissions may be of high relevance for evaluation of the overall climate effects.

These emissions may also be included within the tool (provided the information is reliable) and will be added automatically to the global emission figure:

		C	Product A	Product B
Personal offer ID:			Lamp_Inst.A	Lamp_Inst.B
All entered values will be treated ***cumulatively***				
Absolute figures for embedded emissions				
Embedded emissions by production		kg CO2/unit		
Embedded emissions by transportation		kg CO2/unit		
Embedded emissions by installation		kg CO2/unit		
Embedded emissions by disposal		kg CO2/unit		
TOTAL		kg CO2/unit	0	0

Note: Where you wish to include information on the embedded emissions of products, it needs to be ensured that any data submitted by suppliers is based on sound life-cycle assessment (LCA). In tendering it is important to very clearly specify whether such information shall be given or not, and if so, make a very clear reference to both the methodical conditions and the scope (system boundaries) of considered upstream and downstream effects which you want to have included. It is advised only to do this with the support of LCA experts. The complexity of a full LCA can not be addressed with the LCC-CO2 tool provided, therefore this tool only allows for the inclusion of previously calculated aggregated data on embedded emissions.

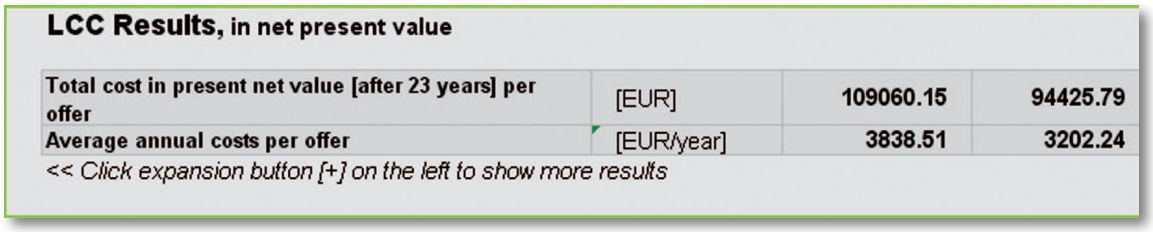
Further information on LCA data can be found here: ***http://lca.jrc.ec.europa.eu/lcainfohub/directory.vm***

STEP 3: RESULTS

Once all data from the different solutions (and, if possible, from the present situation) has been compiled you will need to introduce them in the tool. Give each offer a short name and a separate column (Product A, Product B, Product C,...). Then paste into the corresponding cells the information provided by companies in the corresponding white cells. Make sure that you fill in the columns continuously from left to right without leaving a column free.

Once all solutions are entered you will be able to see the final results and compare offers.

The key LCC results – total costs per planning horizon and year- are shown in lines 63 and 64 of the GENERAL sheet. You can view more detailed and specific results (total costs for 25 years and per unit) by clicking on the expansion button left of the sheet.



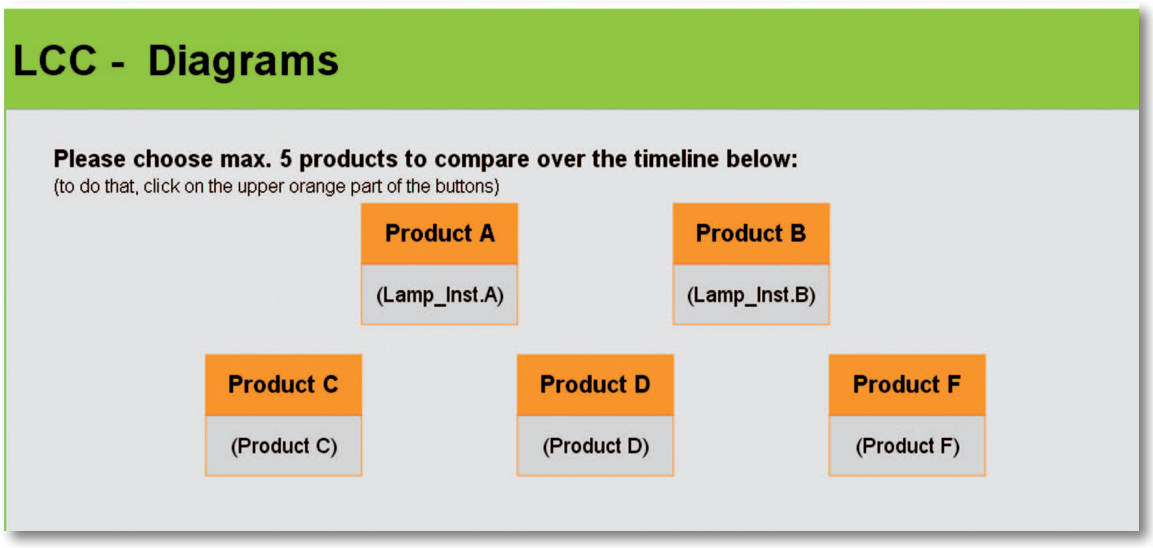
LCC Results, in net present value

Total cost in present net value [after 23 years] per offer	[EUR]	**109060.15**	**94425.79**
Average annual costs per offer	[EUR/year]	**3838.51**	**3202.24**

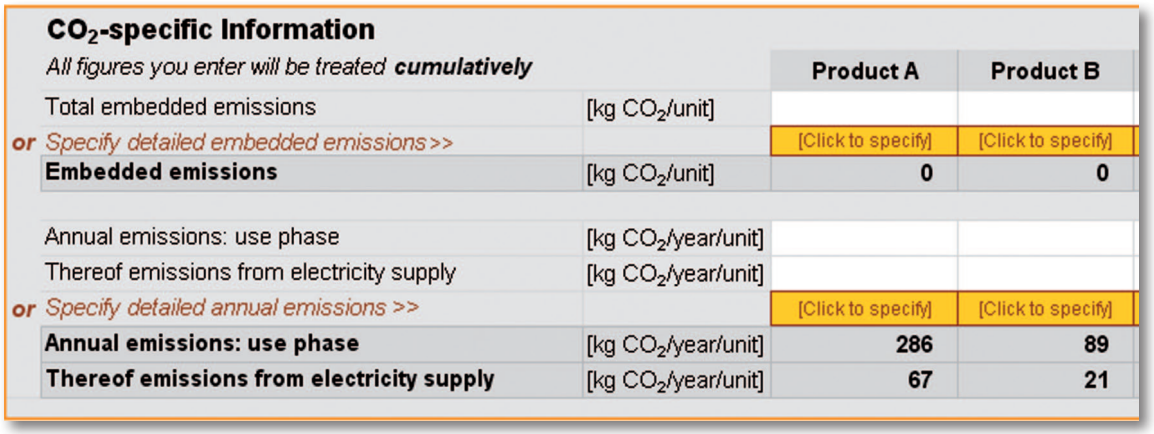
<< Click expansion button [+] on the left to show more results

In order for you to see the LCC results graphically, click on the light orange button that will take you to the LCC_DIAGRAMS sheet.

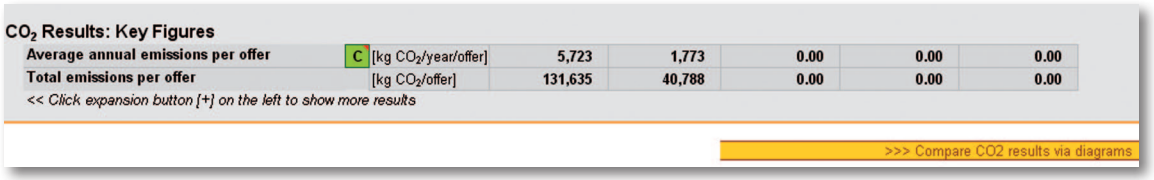
Be aware though that in order to see well the differences, you will only be able to compare 5 products at a time. To choose them you will have to select them by specifying them in the orange cells.



The CO_2 key results are given in lines 93 and 94 of the GENERAL sheet. You can view more detailed and specific results by clicking on the expansion button left of the sheet.



CO_2-specific Information			
All figures you enter will be treated ***cumulatively***		**Product A**	**Product B**
Total embedded emissions	[kg CO_2/unit]		
or *Specify detailed embedded emissions >>*		[Click to specify]	[Click to specify]
Embedded emissions	[kg CO_2/unit]	**0**	**0**
Annual emissions: use phase	[kg CO_2/year/unit]		
Thereof emissions from electricity supply	[kg CO_2/year/unit]		
or *Specify detailed annual emissions >>*		[Click to specify]	[Click to specify]
Annual emissions: use phase	[kg CO_2/year/unit]	**286**	**89**
Thereof emissions from electricity supply	[kg CO_2/year/unit]	**67**	**21**



CO_2 Results: Key Figures							
Average annual emissions per offer	C	[kg CO_2/year/offer]	5,723	1,773	0.00	0.00	0.00
Total emissions per offer		[kg CO_2/offer]	131,635	40,788	0.00	0.00	0.00

<< Click expansion button [+] on the left to show more results

>>> Compare CO2 results via diagrams

Emissions are distinguished between overall emissions and emissions deriving from electricity consumption. This is NOT relevant within the tendering process. This distinction is of relevance for monitoring and using the figures for the municipal carbon accounting – many carbon accounting standards do distinguish between emissions from your own combustion and emissions which occur when generating the electricity for your supply. For this purpose, the tool provides you with the figures readily available.

You can view diagrams showing the results by clicking on the light orange button that will take you to the CO_2_DIAGRAMS sheet. Again, more graphics are available when clicking the expansion button on the **left** side of the sheet.

Attention! If the offers consist of several elements, you won't be able to see the aggregated graphical representation of the results, but you will have to combine them yourself.

STEP 4: TENDERS EVALUATION AND AWARD OF THE CONTRACT

Within the sheet TENDER EVALUATION this tool also allows you to compare the different proposed solutions and to identify the economically most advantageous offer considering the life cycle costs calculated in the GENERAL sheet as well as the rest of the award criteria of the tender (such as the CO_2 emissions also calculated in the GENERAL sheet).

To do so, you will have to specify:

- the compulsory criteria;
- the award criteria, the maximum points for each of them and the points that the different offers obtain in each criterion. The LCC and CO_2 values have also been included as award criteria. The formula applied to distribute points for those 2 award criteria is arithmetic progression between the lowest offer and the rest.

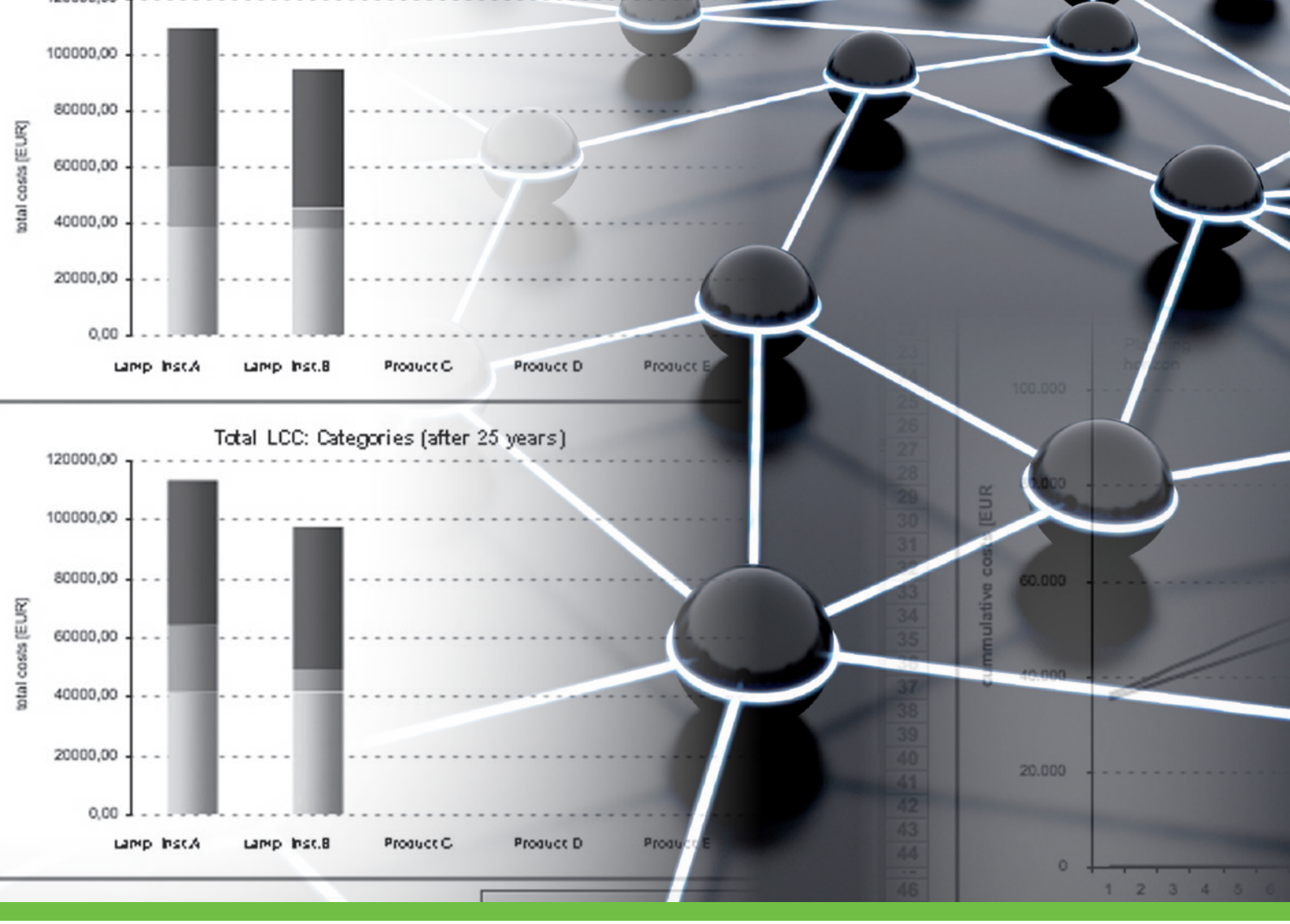
CO_2 emissions can either be used as only an award criterion (like cost) or can be also defined as a minimum technical specification which all offers must achieve; and

- The weighting factors of each of the award criteria defined above make sure that the total is not higher than 100%.

With this information, the tool calculates the economically most advantageous offer automatically and highlights it in green.

Attention! If the offers consist of several elements, in order to identify the economically most advantageous solution, you will have to: **1)** add the results of the different element of each offer to have the total LCC and CO_2 emissions and **2)** introduce those figures in the rows 70 and 71 of the TENDERS EVALUATION sheet.

➔ *We hope that everyting is clear now and wish you a successful innovative procurement process!*



SMART SPP – innovation through sustainable procurement

Running from September 2008 until August 2011 **"SMART SPP - innovation through sustainable procurement"** is a three year project which will promote the introduction of new, innovative low carbon emission technologies and integrated solutions onto the European market. This will be done through encouraging early market engagement between public authority procurers and suppliers and developers of new innovative products and services in the pre-procurement phase of public tendering.

SMART SPP is an initiative of the Procura+ Campaign, that is run by **ICLEI – Local Governments for Sustainability** and designed to help support public authorities across Europe in implementing Sustainable Procurement and help promote their achievements. *For more information visit* **www.procuraplus.org**

Supported by: Intelligent Energy Europe

An initiative of: Procura+ Sustainable Procurement Campaign

Kolding Kommune

Öko-Institut e.V. Institut für angewandte Ökologie Institute for Applied Ecology

INETI Instituto Nacional de Engenharia, Tecnologia e Inovação, I.P.

ecoinstitut Barcelona

ICLEI Local Governments for Sustainability

bfub Bundesverband für Umweltberatung e.V.

ESPO Eastern Shires Purchasing Organisation

energia Agência Cascais Energia

Bromley The London Borough www.bromley.gov.uk

Ajuntament de Barcelona